

## R E M A R K S

In the present Office action, claims 1-14 were examined. Claims 1, 2, 4 and 6-14 were rejected. Claims 3 and 5 were objected to. Claims 15 and 16 have been added. Claims 1, 5, 7, 8 and 10 have been amended in accordance with the Examiner's instructions. No new matter has been added. Claims 1-16 are now believed to be in condition for allowance.

### Claim Objections

The Examiner objected to claims 1-9, 11 and 12 as a result of numerous informalities. Applicants have taken care herein to amend claims 1, 2, 5, 7, 11 and 12 in accordance with the Examiner's suggestions. As a result, Applicants respectfully traverse the grounds for the Examiner's objections with regards to claims 1, 5 and 7.

### Claims Rejections under 35 U.S.C. 112

The Examiner rejected claims 8, 13 and 14 as being indefinite for failing to particularly point out and distinctly claim the subject matter of the present invention. Specifically, the Examiner rejected claim 8 for the inclusion of both a broad and narrow range in the same claim. Applicants have amended claim 8 to remove the second, narrower range and has added claim 15. Claim 15 closely tracks original claim 8 with the substitution of the narrower range for the aforementioned broader range.

The Examiner rejected claims 13 and 14 for not setting forth a positive step involved in the method or process described in the claim. As amended herein, claims 13 and 14 now recite a positive step. Applicants therefore traverse the grounds for rejection with regards to claims 13 and 14. Claims 13 and 14 are now believed to be in condition for allowance.

#### Claim Rejections under 35 U.S.C. 102 and 103

The Examiner rejected claims 1, 4, 9, 10, 11 and 12 as being anticipated by either Borysko (US Patent 4,587,202) or Akamine et al. (US Patent 4,943,719). Claims 11 and 12 have been canceled. With regards to claims 1, 4, 9 and 10, Applicants respond as follows. The Examiner most helpfully suggested amended versions of claims 1 and 10 which more clearly define Applicants' invention in light of the prior art. The Examiner further noted that by incorporating the suggested amendments, claims 1 and 10 are sufficiently distinguished from the prior art. Applicants have herein amended claim 1 to include each and every suggestion of the Examiner regarding claims 1 and 10. As a result, claims 1 and 10 are believed to be in condition for allowance and traverse the Examiner's original grounds for rejection. As claims 4 and 9 depend upon claim 1, claim 1 now believed to be in condition for allowance, claims 4 and 9 are likewise believed to be in condition for allowance.

Claims 11 and 12 are amended herein to replace "from" with "of". By so doing, it is now clearly recited in claims 11 and 12

that the tip fabricated according to the present invention actually consists of photoresist. In contrast to claims 11 and 12, as amended, Akamine et al. discloses a tip made of silicon oxide which uses photoresist only for shaping the oxide. Akamine et al. does not disclose a tip made or consisting of photoresist. As a result of these amendments, claims 11 and 12 are now believed to be in condition for allowance.

#### Claim Rejections under 35 U.S.C. 103

The Examiner rejected claims 2, 6, 7 and 8 as being obvious in light of cited prior art. For the reasons noted above, by incorporating the Examiner's suggested amendments for claims 1 and 10, claims 1 and 10 are now believed to overcome the Examiner's grounds for rejections. Specifically, claims 1 and 10 are now properly differentiated from the prior art. As a result claims 1 and 10 are believed to be in condition for allowance and claims 2, 6, 7 and 8, depending upon claim 1, are likewise believed to be in condition for allowance.

#### Allowable Subject Matter

The Examiner objected to claims 3 and 5 as being dependent upon a rejected base claim, but noted that they would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. As noted above, claim 1 is now believed to be in condition for allowance. As claims 3 and 5 depend upon claim 1, claim 1 now

believed to be in condition for allowance, claims 3 and 5 are likewise believed to be in condition for allowance absent the inclusion of any base claim or intervening claims. Therefore, claims 3 and 5 are now believed to be in condition for allowance.

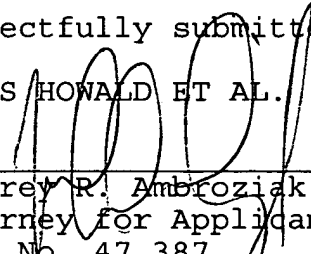
An earnest and thorough attempt has been made by the undersigned to resolve the outstanding issues in this case and place same in condition for allowance. If the Examiner has any questions or feels that a telephone or personal interview would be helpful in resolving any outstanding issues which remain in this application after consideration of this amendment, the Examiner is courteously invited to telephone the undersigned and the same would be gratefully appreciated.

It is submitted that the claims as amended herein patentably define over the art relied on by the Examiner and early allowance of same is courteously solicited.

If any fees are required in connection with this case, it is respectfully requested that they be charged to Deposit Account No. 02-0184.

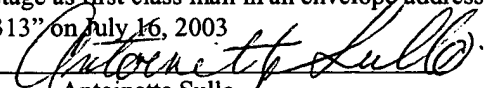
Respectfully submitted,

LUKAS HOWARD ET AL.

By   
Jeffrey R. Ambroziak  
Attorney for Applicants  
Reg. No. 47,387  
Tel: (203) 777-6628  
Fax: (203) 865-0297

Date: July 16, 2003

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: "Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313" on July 16, 2003

  
Antoinette Sullo

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at line 7 of page 11 has been amended as follows:

In the next step, the cantilever or the component onto which the tip should be mounted is prepared. In Fig. 1a this cantilever is called a [„tuning fork"] "tuning fork". In the example shown and described, a corresponding semiconductor wafer is cleaned using  $H_2SO_4 + H_2O_2$  in order to remove any organic material from the surface. Preferably, the provided primer is used for the photosensitive resist material, here EPON SU-8 (e.g., from the companies Micro Resist Technology or SOTEC), since gold is not affected or removed by  $H_2SO_4$ , for instance. The wafer can be inserted into it and, subsequently, be dried, or the wafer can be exposed to the primer being in a gaseous state.

Paragraph beginning at line 18 of page 16 has been amended as follows:

The use of photosensitive resist tips with larger bending radius and/or certain edge [angels] angles can be necessary for other applications than scanning probe microscopy, for example for profile meters or measuring scanners for certain purposes. This has been mentioned above. It should be possible without problems for one trained in the art, in such cases to design the exposure masks accordingly and, in particular, to select the exposure angle such that the desired tip profile is created. It is also

possible to further adjust the profile design by varying the photosensitive resist used for the given needs.

IN THE CLAIMS:

Claims 1, 2, 5, 7, 8 and 10 have been amended as follows:

1. (Amended) [A process for producing and/or repairing very fine tips made from a photostructurable material on a carrier, in particular for utilization in scanning probe microscopy, characterized in that

- the carrier is positioned on an exposure mask whose exposure section correlates to the tip to be produced or repaired,
- the photostructurable material is applied onto the exposure mask and/or the carrier,
- an exposure of the photostructurable material occurs via the exposure mask
- in a manner known per se, the exposed photostructurable material is hardened and the unexposed material removed, and

- the carrier with the tip and the exposure mask are separated from one another.]

A process for producing and/or repairing very fine tips made of a photostructurable material on a carrier, characterized in that

the carrier is positioned on a first side of an exposure mask whose exposure section correlates to the tip to be produced or repaired,

the photostructurable material is applied onto the first side of the exposure mask and/or the carrier,

an exposure of the photostructurable material occurs via the exposure mask from a second side opposite the first side,

the exposed photostructurable material is hardened and the unexposed material removed, and

the carrier with the tip and the exposure mask are separated from one another.

2. (Amended) The process according to claim 1, characterized in that the exposure occurs in a directed manner[, in particular] in a direction diagonal or inclined towards the tip.

5. (Amended) The process according to claim 1, characterized in that prior to the [directing] positioning of the carrier a small amount of the photostructurable material is applied onto the exposure mask so that the carrier adheres to the [latter] mask.
7. (Amended) The process according to claim 1, characterized in that [preferably] SU-8 is used as [the photosensitive resist] a structurable material and that [the so-called] a spin coating is used for its application.
8. (Amended) The process according to claim 1, characterized in that the exposure mask is [preferably] made from quartz and the exposure section provides the tip with a radius of less than 1  $\mu\text{m}$ [, preferably approximately 0.7  $\mu\text{m}$ ].
10. (Amended) [A process for producing and/or repairing very fine tips made from a photostructurable material on a carrier, in particular for utilization in scanning probe microscopy, comprising
- providing a multitude of carriers positioned on a wafer in an undivided manner,
  - arranging an exposure mask provided with a multitude of exposure sections positioned correspondingly,



- applying said photostructurable material onto said exposure mask and/or said carriers,
- conducting a simultaneous, inclined or diagonal exposure of all said provided carriers on said wafer via said exposure mask, hardening said exposed photostructurable material and removing any unexposed photostructurable material, and
- separating said exposure mask from the wafer.]

A process for producing and/or repairing very fine tips made of a photostructurable material on a carrier, comprising:

providing a multitude of carriers positioned on a wafer in an undivided manner,

arranging an exposure mask provided with a multitude of exposure sections positioned in correspondence with the multitude of carriers so that the carriers are positioned on a first side of the exposure mask,

applying said photostructurable material onto the first side of said exposure mask and/or said carriers,

conducting a simultaneous, inclined or diagonal exposure of all said provided carriers on said wafer from a second side, opposite the first side, of said exposure mask, hardening said exposed photostructurable material and

removing any unexposed photostructurable material to form  
said fine tips, and  
separating said exposure mask from the wafer.

11. (Amended) A probe[, particularly] for use in scanning probe microscopy, [characterized in that] comprising a tip [made from] of a hardened photosensitive resist [is] produced and/or mounted laterally at or on a carrier [preferably comprising a semiconductor or quartz material, in particular] forming [the] a cantilever of a scanning probe microscope.
12. (Amended) The probe according to claim 11, [characterized in that] wherein the tip [is made and/or mounted from] consists of photosensitive resist and is fabricated by [means of] a process [known per se from] for making photoresist etch masks in the production of semiconductors[, in particular subsequent to the production of the carrier].
13. (Amended) Use of a tip produced according to claim 1 in a scanning probe microscope[, in particular for the examination of] comprising the step of examining a so-called soft specimen [and/or] in a vacuum or at low pressure.

14. (Amended) Use of a probe embodied according to claim 11 in a scanning probe microscope[, in particular for the examination of] comprising the step of examining a so-called soft specimen [and/or] in a vacuum or at low pressure.